

24

~~SECRET~~

LA-11749

UNIQUE DOCUMENT SAC 0000 8692000

This document consists of 22 pages.

~~Number 86-122~~

~~Nuclear Weapon Data
Sigma 2~~

~~Critical Nuclear Weapon
Design Information
DoE Directive 7210.2 Applied~~

A Review of the Development of Los Alamos Gnats and Tsetses before the 1958 Test Moratorium (U)

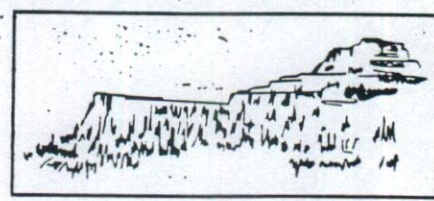
Lawrence S. Germain
January 2, 1991

CIC-14 REPORT COLLECTION
**REPRODUCTION
COPY**

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
1ST REVIEW DATE: 3-27-96	DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: <input type="checkbox"/> AOC <input type="checkbox"/> EAC <input type="checkbox"/> ADD	<input checked="" type="radio"/> 1. CLASSIFICATION RETAINED
NAME: <i>James C. Linn</i>	<input type="radio"/> 2. CLASSIFICATION CHANGED TO:
DATE: 9-17-96	<input type="radio"/> 3. CONTAINS NO DOE CLASSIFIED INFO
BY: <i>R.H. Smiley</i>	COORDINATE WITH:
	<input type="checkbox"/> 4. CLASSIFICATION CANCELLED
	<input type="checkbox"/> 5. UNCLASSIFIED INFO BRACKETED
	<input type="checkbox"/> 6. OTHER SPECIFY:

PLEASE RETURN TO REPORT LIBRARY, P36-
WHEN NO LONGER NEEDED.

~~RESTRICTED DATA~~
This document contains Restricted Data as
defined in the Atomic Energy Act of 1954.
Unauthorized disclosure subject to
administrative and criminal sanctions.



CNSS

Center for National Security Studies
Los Alamos National Laboratory

~~Derivative Classifier
E. M. Sandoval
GS-6 Classification Analyst~~

Los Alamos Los Alamos National Laboratory
Los Alamos, New Mexico 87545
Los Alamos National Laboratory is operated by the University of California for the
United States Department of Energy under contract W-7405-ENG-36.

~~SECRET~~

955 A000 000 138

~~SECRET~~

LA-11749

January 2, 19

An Equal Opportunity/Affirmative Action Employer Operated by the University of California

NOTICE: Reproduction of this document requires the written consent of the originator, his successor, or higher authority.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

CENTER FOR NATIONAL SECURITY STUDIES

The Center for National Security Studies is a studies and analysis organization of the Los Alamos National Laboratory. Drawing on the broad knowledge at Los Alamos of science and engineering relevant to national security issues, the Center's research focuses on the interaction between technology and policy and on developing insights that may improve the relationship between the development of new technology and the achievement of national policy goals. The Center's staff includes both resident and visiting researchers.

The Center promotes and conducts long-term research and analysis in the broad areas of defense policy and arms control. In addition, it provides insight into near-term national security policy, strategy, and technology issues in support of Laboratory management and staff. The Center also facilitates the exchange of ideas on international security issues among Laboratory personnel, government agency staffs, university faculties, and interested citizens.

The Center documents its work in a number of publications. The *Briefings* are informal papers commenting on timely topics that are appropriate to the Center's areas of interest. The *Reports* are formal research papers or edited conference proceedings. A book series, *Issues in International Security*, presents the results of the Center's research on key national and international security issues.

~~SECRET~~

~~SECRET~~

LA-11749

January 2, 1991

*A Review of the Development of
Los Alamos Gnats and Tsetses
before the 1958 Test Moratorium (U)*

Lawrence S. Germain

~~Nuclear Weapon Data
Sigma 2~~

~~Critical Nuclear Weapon
Design Information
DoD Directive 5210.2 Applies~~

~~RESTRICTED DATA~~

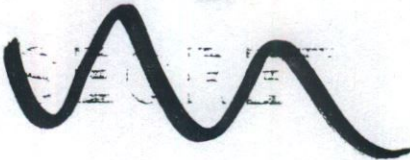
~~This document contains Restricted Data as
defined in the Atomic Energy Act of 1954.
Unauthorized disclosure is subject to
administrative and criminal sanctions.~~



CNSSS

Center for National Security Studies
Los Alamos National Laboratory

~~SECRET~~



Lawrence S. Germain retired from the Los Alamos National Laboratory in 1985 after thirty years of experience in weapons design and testing in the national laboratories—twenty years at Lawrence Livermore National Laboratory and ten years at Los Alamos. He received a Ph.D. in physics from the University of California, Berkeley, in 1949 and taught physics for four years at Reed College, Portland, Oregon, before joining Livermore. Much of this report is drawn from the author's memory, and many of the opinions expressed reflect his personal recollections.

The first draft of this report was written in 1988, and the information in the report does not reflect events or research since 1988.



~~SECRET~~

~~SECRET~~

January 2, 1991



DOE
b(3)

~~SECRET~~

PREFACE

This report is one in a CNSS series that surveys the development of nuclear weapons over the past forty-five years. The unifying themes throughout the series are the technical advances and failures associated with new weapon systems, and the creation of the stockpile.

Authors, titles, and report numbers are listed below.

William G. Davey, *Free-Fall Nuclear Bombs in the U.S. Stockpile (U)*, LA-11397

William G. Davey, *Nuclear Tests Related to Stockpiled Weapons Development (U)*, LA-11402

Lawrence S. Germain, *A Brief History of the First Efforts of the Livermore Small-Weapons Program (U)*, LA-11404

Lawrence S. Germain, *The Evolution of U.S. Nuclear Weapons Design: Trinity to King (U)*, LA-11403

Lawrence S. Germain, *A Review of the Development of Los Alamos Gnats and Tsetses before the 1958 Test Moratorium(U)*, LA-11749

Raymond Pollock, *The Evolution of the Early Thermonuclear Stockpile (U)*, LA-11748

Raymond Pollock, *A Short History of the U.S. Nuclear Stockpile 1945-1985 (U)*, LA-11401

(All reports are classified Secret Restricted Data)

~~SECRET~~

January 2, 1991

A REVIEW OF THE DEVELOPMENT OF LOS ALAMOS GNATS AND TSETSES BEFORE THE 1958 TEST MORATORIUM (U)

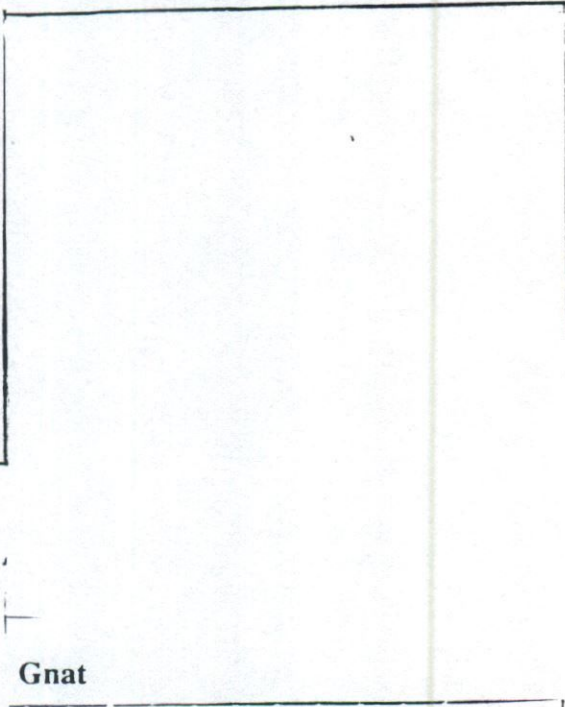
Lawrence S. Germain

ABSTRACT (U)

This report, one in a series concerned with the history of nuclear-weapons research and development, outlines the evolution of the Los Alamos Gnat and Tsetse systems before the 1958 test moratorium.

INTRODUCTION

The evolution of nuclear fission explosives at Lawrence Livermore National Laboratory (then the University of California Radiation Laboratory) from its inception in 1952 until the onset of the nuclear test moratorium in 1958 has been treated in Lawrence S. Germain, "A Brief History of the First Efforts of the Livermore Small-Weapons Program (U)," Los Alamos National Laboratory Report LA-11404, May 1990 (SRD).



Gnat

~~SECRET~~

~~SECRET~~

January 2, 1991

DoE
b(3)

Gnat

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

~~SECRET~~

~~SECRET~~

January 2, 1991

DOE
b(3)

DOE
b(3)

DOE
b(3)

Gnat

DOE
b(3)

DOE
b(3)

Tsetse

DOE
b(3)

DOE
b(3)

~~SECRET~~

~~SECRET~~

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
(3)

DOE
b(3)

I

DOE
b(3)

DOE
b(3)

Tsetse

DOE
b(3)

DOE
b(3)

~~SECRET~~

~~SECRET~~

January 2, 1991

~~HARDTACK II~~

Gnat

Tsetse

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

~~SECRET~~

~~SECRET~~

January 2, 1991

DOE,

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

~~SECRET~~

DoI
b(3)

DOE
b(3)

DoI
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

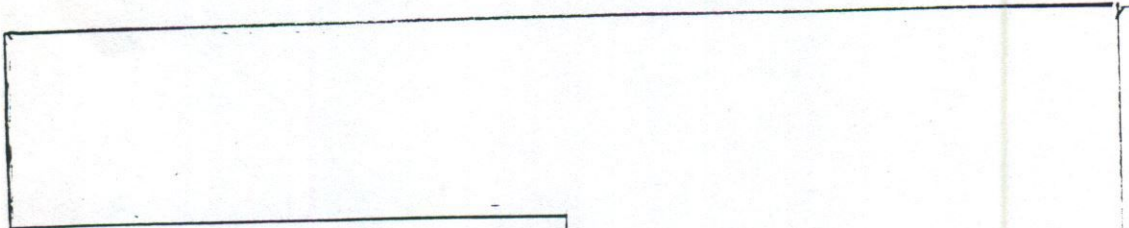
SUMMARY OF FAMILIES

The pre-moratorium family histories of the two systems discussed in this report are shown in Figs. 1 and 2.

DOE
b(3)

~~SECRET~~

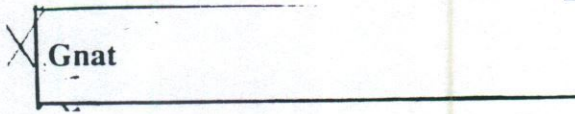
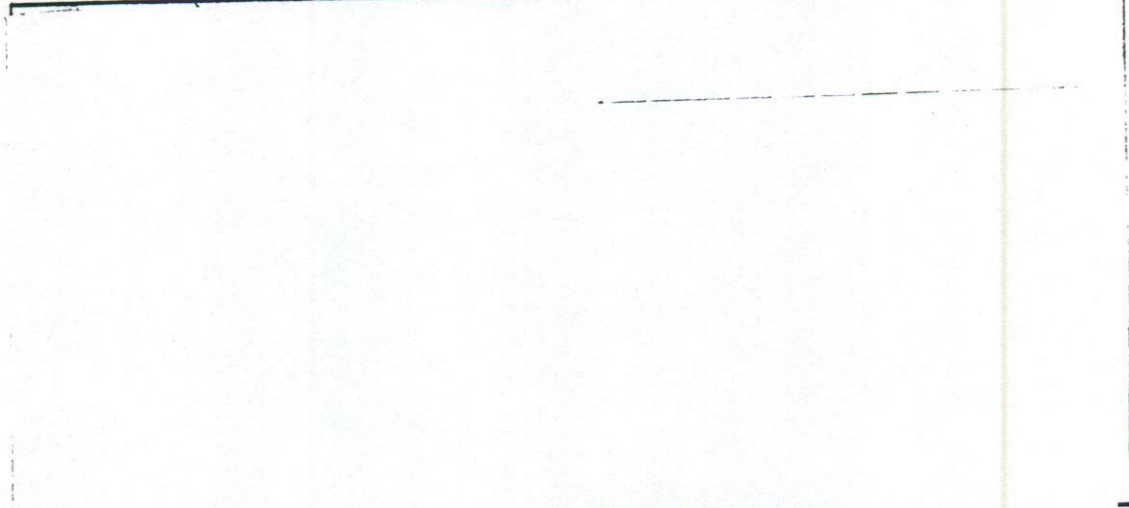
DOE
b(3)



DOE
b(3)

Tsetse

DOE
b(3)



DOE
b(3)

DOE
b(3)

DOE
b(3)

~~SECRET~~

~~SECRET~~

January 2, 1991

DOE
b(3)

DOE
b(3)

• DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

DOE
b(3)

~~SECRET~~

~~SECRET~~

January 2, 1991

DoE
b(3)

DoE
b(3)

DoE
b(3)

DoE
b(3)

~~SECRET~~

LA-11749

~~SECRET~~

January 2, 1991

DOE
b(3)

~~SECRET~~

~~SECRET~~

POE
b(3)



~~SECRET~~

SECRET

January 2, 1991

LA-11749 DISTRIBUTION

Address	<u>Copy No.</u>
U.S. Department of Energy Library, MA-442, Room G-042 (GTN) (3 copies) Attn: Transfer Accountability Station Washington, DC 20545	1A-3A
For: Department of Energy Washington, Washington, DC	4A
Assistant Secretary for Defense Programs, DP-1, 4A-014/FORS	5A
Deputy Assistant Secretary for Military Application, DP-20, A-367/GTN	6A
Director, Office of Weapons Research, Development, and Testing, DP-24, A-368/GTN	7A
Director, Weapons Research Division, DP-242, A-386/GTN	8A
Director, Advanced Concepts Division, DP-241, B-314/GTN	9A
Director, Inertial Fusion Division, DP-243, C-417/GTN	10A
Associate Director for Weapons Program Safety, DP-20.1, C-417/GTN	11A
Office of Weapons Safety and Operations, DP-22, C-420/GTN	12A
Office of Weapons Production, DP-23, A-483/GTN	13A
Office of Planning and Project Management, DP-25, A-467/GTN	14A
Deputy Assistant Secretary for Security Affairs, DP-30, 4C-024/FORS	15A
Office of Classification and Technology Policy, DP-32, C-379/GTN	16A
Deputy Assistant Secretary for Security Affairs, DP-30, 4C-024/FORS	17A
Office of Classification and Technology Policy, DP-32, C-379/GTN	18A
Deputy Assistant Secretary for Nuclear Materials, DP-10, 4A-043/FORS	19A
Director, Office of Nuclear Materials Production, DP-13, A-302/GTN	20A
Director, Office of Arms Control, DP-5, 4B-014/FORS	21A
U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831 Attn: Weapon Data Index	22A
U.S. Department of Energy Albuquerque Operations Office Attn: TA Station (1 copy) P.O. Box 5400 Albuquerque, NM 87115	23A
Sandia National Laboratories Attn: Mail Services Section P.O. Box 5800 Albuquerque, NM 87185 For: Technical Library (2 copies)	24A, 25A
University of California Lawrence Livermore National Laboratory Attn: Mail Stop L-313 P.O. Box 808 Livermore, CA 94550 For: Library, Reports Section (2 copies) John H. Nuckolls, Director	26A, 27A
Director Defense Nuclear Agency Attn: SSAB (2 copies) 6801 Telegraph Rd. Alexandria, VA 22310-3398	28A, 29A

SECRET

SECRET

January 2, 1991

Address

Copy No.

FCDNA/FCSAC

Attn: Bettye J. Garbutt (2 copies)
Kirtland AFB, NM 87115-5000

30A, 31A

WL/SUL

Kirtland AFB, NM 87117-6008

32A

Los Alamos National Laboratory

Attn: Report Library (2 copies)

Mail Station 5000

P.O. Box 1663

Los Alamos, NM 87545

33A, 34A

For: S. S. Hecker, DIR, MS A150

T. P. Seitz, NWT-WP, MS F633

J. F. Jackson, DIR OFC, MS A101

J. C. Browne, ADDRA, MS A110

J. C. Hopkins, ADAL-CNSS, MS A112

F. A. Morse, ADR, MS A114

E. M. Wewerka, ADCM, MS A102

J. T. Whetten, ADET, MS A107

C. A. Fenstermacher, NWT/AGEX, MS P916

D. C. Cartwright, NWT/ICF, MS E527

J. C. Porter, X-DO, MS B218

D. W. Watkins, NWT/PD, MS B218

P. T. Cunningham, CM/NM, MS F628

L. W. Madsen, ADNWT, MS F633

R. E. Kelley, ADNWT, MS F633

Turner J. Trapp, A-DO, MS F606

Richard J. Beckman, A-1, MS F600

J. Wiley Davidson, A-3, MS F607

Richard Mah, CM/WCR, MS G753

Stanley O. Schriber, AT-DO, MS H818

Dennis H. Gill, CLS-DO, MS J563

Harry J. Dewey, CLS-1, MS G740

Harry H. Watanabe, CLS-3, MS J563

Patrick Garrity, CNSS, MS A112

Roger A. Meade, CRM-1, MS C322

Rulon K. Linford, CTR-DO, MS E529

John D. Immele, DRA-CDT, MS F668

Sidney Singer, DRA-DEST, MS F617

C. L. Edwards, EES-3, MS C335

W. Doyle Evans, ET-AC, MS F650

Robert A. Jeffries, ET-AC, MS F650

Charles F. Keller, ET-IGPP, MS D437

Robert R. Ryan, INC-4, MS C346

William R. Daniels, INC-11, MS J514

Danny B. Stillman, IT-DO, MS B224

Delbert M. Jones, IT-2, MS B229

Arvid S. Lundy, IT-3, MS B230

Harald O. Dogliani, IT-4, MS B232

Joel N. Peterson, J-6, MS C925

Jerry N. Beatty, J-7, MS D411

35A

36A

37A

38A

39A

40A

41A

42A

43A

44A

45A

46A

47A

48A

49A

50A

51A

52A

53A

54A

55A

56A

57A

58A-61A

62A

63A

64A

65A

66A

67A

68A

69A

70A

71A

72A

73A

74A

75A

76A

77A

SECRET

SECRET

January 2, 1991

Address

Copy No.

D. J. Erickson, ADNWT, MS A105	78A
Thomas E. Larson, M-1, MS C920	79A
J. Michael Christian, M-4, MS P940	80A
Charles E. Morris, M-6, MS J970	81A
John M. McAfee, M-7, MS P950	82A
James W. Straight, M-8, MS J960	83A
Allan B. Anderson, M-9, MS P952	84A
John D. Allen, MEE-4, MS G787	85A
Peter L. Bussolini, ENG-3, MS A150	86A
Donald J. Sandstrom, MST-DO, MS G756	87A
James L. Anderson, MST-3, MS C348	88A
George F. Hurley, MST-4, MS G771	89A
Hugh Casey, ADCM, MS A102	90A
Thomas J. Hirons, N-DO, MS E561	91A
Nicholas Nicholson, N-2, MS J562	92A
Delbert R. Harbur, NMT-DO, MS E500	93A
Robert Bruce Matthews, NMT-1, MS E505	94A
Robert H. Day, P-DO, MS D408	95A
Gottfried T. Schappert, P-DO, MS E545	96A
Thomas F. Stratton, P-DO, MS D408	97A
R. James Trainor, P-1, MS E545	98A
John D. Moses, P-3, MS D437	99A
Larry J. Rowton, P-9, MS D437	100A
D. D. Cobb, SST-DO, MS D437	101A
James N. Johnson, T-1, MS B221	102A
Phillip G. Young, T-2, MS B243	103A
John W. Hopson, T-3, MS B216	104A
James P. Ritchie, T-14, MS B214	105A
G. G. Hill, WX-DO, MS P945	106A
Joseph Lynn Parkinson, WX-3, MS C930	107A
Charles B. Banks, WX-5, MS G780	108A
John J. Ruminer, WX-11, MS C931	109A
H. P. Newton, X-4, MS F664	110A
P. C. White, X-DO, B218	111A
Donald C. Wolkerstorfer, X-DO, MS B218	112A
Douglas C. Wilson, X-1, MS F645	113A
Rodney B. Schultz, X-2, MS B220	114A
Richard A. Krajcik, X-4, MS F664	115A
David A. Poling, X-5, MS F669	116A
Robert C. Little, X-6, MS B226	117A
Eldon J. Linnebur, X-7, MS B257	118A
John H. Brownell, X-10, MS B259	119A

Office of the Assistant to the Secretary of Defense (Atomic Energy)

Room 3E1074, The Pentagon

Washington, DC 20301-3050

For: Deputy Undersecretary of Defense Research and Engineering (Atomic Energy)

120A

Defense Intelligence Agency

Attn: DT-1B Branch Chief

Washington, DC 20340-6160

For: Charles E. Rowe, LTCOL/USAF

121A

Chief

Joint Atomic Information Exchange Group

6801 Telegraph Rd

Alexandria, VA 22310-3398

122A

SECRET

~~SECRET~~

This page intentionally left blank.

~~SECRET~~